

BENCHMARK STUDY

THE AGRICULTURAL TECHNOLOGY DEVELOPMENT FUND FOR CONTRACT RESEARCH: AN INIA (URUGUAY) INITIATIVE

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As part of a process of democratization and political renewal in Uruguay, the Government of Uruguay rehabilitated its agricultural research organization to create the National Institute for Agricultural Research (Spanish acronym INIA) in 1989. A public nongovernmental organization, INIA introduced a novel way of strengthening agricultural research capacity in the country by creating the Agricultural Technology Development Fund (Spanish acronym FPTA). The fund helps finance agricultural research that non-INIA researchers carry out outside INIA.

The fund has proved to be a very flexible mechanism for establishing links to national and international sources of knowledge. This Briefing Paper describes how INIA identifies and selects projects for FPTA funding, and how it manages the fund. It highlights some key lessons learned. One key factor contributing to the FPTA's success is that it has enjoyed strong political support from the whole agricultural sector. Another important factor has been the two-year limit on FPTA projects, which encourages researchers to focus on practical results.

INIA has found the FPTA an excellent tool to establish strategic alliances with other agricultural research organizations and institutes in Uruguay and help coordinate their research efforts and to achieve a multiplier for its own research efforts. ISNAR therefore chose INIA's FPTA as a "benchmark" for other agricultural research organizations.

A benchmark is an example of a particularly successful management practice from an organization that is documented and used as a model for other organizations. This Briefing Paper is the fourth of a series of benchmark studies from research organizations in developing countries. These benchmark studies are intended to inspire other research organizations to copy or adapt aspects of the successful management practices described.

Introduction

Uruguay's National Institute for Agricultural Research (INIA) is a public nongovernmental organization, that is, a public enterprise that is entitled to government funding but authorized to act as a private

organization in some ways. For example, INIA can select its own staff, decide on its own management procedures, and sign contracts and agreements with private, national, and international entities.



In 1997, INIA staff totaled nearly 500, including 136 professionals (15 PhD and 58 MSc). Staff are assigned to 13 “national programs” (winter crops, summer crops, rice, evaluation of cultivars, beef, milk, sheep, pastures, farm animals, horticulture, fruits, citrics, and forestry) or to work in the administrative department.

The institute has five research stations, totaling over 5,000 hectares, one in each of the five regions into which INIA has divided the country. Each region has an advisory regional council, which consist of representatives of agricultural organizations in the region and experienced and knowledgeable technicians and producers. The functions of the councils are being reviewed to strengthen the performance of the councils. Specialized working groups within the councils deal with specific topics such grasses, seeds, crops, and milk. Each working group is represented by a coordinator, ensuring optimum communication between the council and the working groups.

To strengthen the role of farmers in guiding agricultural research (see also box 1), INIA created working groups for each national program. In these working groups, INIA staff and farmers’ representatives discuss research plans for specific commodities and evaluate results. These working groups have been quite productive.

INIA’s top authority is its board of trustees, which consists of (1) two government representatives, one of whom serves as INIA’s president, (2) one representative proposed by the association of Uruguay’s commercial farmers, and (3) one representative proposed by the associations of the country’s small-scale farmers. INIA’s director participates in board meetings and has a voice but cannot vote. Members of the board of trustees are selected in a process of extensive dialogue and consultation with relevant organizations and individuals. The president of the Uruguay appoints the members of the board of trustees, based on nominations made by the minister of livestock, agriculture, and fisheries and producers’ organizations. Members are chosen for a period of three years. This period was designed specifically to separate choices for board positions from the four-year terms of office of elected government officials. Board members can serve more than one term.

Funding

INIA obtains its funds from the following sources:

1. a 0.004 percent cess on farm sales that the public treasury reserves for the institute (a cess is a special tax placed on commodities). The cess is included in the value-added tax (VAT), which is levied on all sales of products in Uruguay.

Box 1: Agriculture and agricultural research in Uruguay

With a total area of 176,215 sq km and a population of 3.2 million, Uruguay is one of the smaller countries in South America. The climate is temperate, with rainfall (average 900 mm) spread throughout the year. Much of the country is grassland plains and wooded valleys. Uruguay has traditionally been an exporter of agricultural products. In 1993, only 13 percent of the working population was employed in agriculture, but agricultural exports nevertheless accounted for over 50 percent of total exports. The two main export products are meat (especially beef) and wool. Meat is also an important item in the local diet, with an annual average consumption of about 70 kg per capita in 1990. The principal crops are rice, wheat, and barley. Citrus, sorghum, and sunflower are increasing in importance.

Uruguay is a country with a solid democratic tradition, with political parties that can trace their origin to the creation of the Republic of Uruguay in 1828. After an interruption by a military dictatorship from 1973 to 1984, the rehabilitated political parties agreed on a series of multiparty, national agreements, including an initiative to strengthen the country’s agricultural sector. Politicians also agreed that in reforming the sector, the role of the public sector in agricultural development needed to be reduced and that farmers should be given a stronger voice in agricultural matters. Uruguay has achieved some high social and economic indicators. Growing at only 0.7 percent per year, its population has a life expectancy of 74 years and a literacy rate of about 97 percent. Per capita income was about US \$2,560 in 1990.

A brief history of agricultural research

Established in 1914, Uruguay’s first agricultural research station became the base for a national agricultural research institute in 1961. After a period of growth in the 1960s, agricultural research dwindled during the 11-year military dictatorship. After the country returned to democratic rule in 1985, the government commissioned a diagnostic review of the country’s agricultural research. The main conclusions of the review were that research programs were disjointed from national development plans, there was a lack of formal client participation, financial resources were scarce and unpredictable, many highly qualified researchers had left the research system, research programs were overextended in relation to existing resources, operating resources were inadequate, facilities were underutilized, administrative procedures were too rigid, and research was poorly managed.

This review was followed by an initiative from the Ministry of Livestock, Agriculture, and Fisheries to rehabilitate agricultural research. In-depth studies by the ministry, ISNAR, and others resulted in a plan to modernize agricultural research and to constitute a legal and institutional framework for it. Various key organizations and leaders in Uruguay’s agricultural sector discussed the plan and presented it as a bill to the National Congress, which passed it as a law in 1989, leading to the foundation of INIA.

2. an amount provided by the government that matches the cess on farm sales
3. voluntary contributions by farmers' and other organizations
4. voluntary contributions, grants, or development loans from outside Uruguay
5. self-generated funds (including income earned from research products and services and commercial produce, royalties, and joint ventures with private enterprises).

Items 1 and 2 make up INIA's core funds. In 1996, INIA received a core budget of US \$8 million, and it earned nearly \$2 million itself. INIA estimated that its 1997

core budget would be about \$10 million. The core budget can vary significantly from year to year, because it is tied first to the total farm production and the farm prices, and second to how much the public treasury actually collects and allocates to INIA.

INIA receives its core budget on a quarterly basis. However, as the institute never knows how much it will receive, it has to adjust its financial forecasts and actual spending throughout the year. For planning purposes, INIA attempts to predict the allocation by estimating, for the next quarter, the total area under cultivation, expected yields, farm prices, and it takes into account estimates provided by the milk and meat industries. INIA does not have to spend its whole allocation in one financial year but can carry over surpluses into other years.

The Agricultural Technology Development Fund

When the government established INIA, it also instituted within INIA the Agricultural Technology Development Fund (Spanish acronym FPTA, for *Fondo de Promoción de Tecnología Agropecuaria*). Aimed to employ INIA in strengthening national agricultural research beyond the institute, the FPTA finances agricultural research projects that INIA carries out in collaboration with (non-INIA) researchers in other research organizations and institutes. FPTA projects have a strong technical orientation and are mostly short-term.

The FPTA was created with the following objectives:

- to enable INIA to establish an integrated national agricultural research system for Uruguay
- to establish strategic alliances with national and international players in agricultural research
- to attract additional financial resources for agricultural research from national and international sources
- to allow INIA to respond with greater flexibility to demands from farmers and other stakeholders
- to allow INIA to build and maintain a closely focused core research plan linked to complementary research and extension activities in other organizations

Research done under an FPTA-funded project is complementary to INIA's own research, and it is not to affect INIA's regular research programming. Every project is assigned a research counterpart from INIA's research staff, who is responsible for monitoring and technical evaluation of the research.

INIA's mandate is to generate technology and formulate recommendations for the use of technologies by farmers. To conduct the research to generate this technology INIA requires adequate scientific information. As the FPTA finances basic research in, for example, the University of the Republic and other relevant organizations, it is an extremely useful tool to ensure that this research information is adequate both in quantity and in quality.

The law by which INIA was established stipulates that INIA must reserve 10 percent of its core funds annually to contract research from other organizations, but INIA can treat the 10% allocation as an average target. As long as INIA maintains the 10% target over the medium term, it can deviate from it, depending on the need for the fund and the availability of projects in any given year.

In 1991, the FPTA became operational, and INIA made a major push to launch the fund. It contracted projects at over \$1 million—20 percent of INIA's core budget in that year. As this proved to be much more research than INIA could supervise, INIA reduced the total funding for FPTA research contracts for 1992 and 1993 to \$400,000 per year—about eight percent of the core budget. As INIA built up experience in managing FPTA contracts, it gradually increased the annual amount. In 1996, research contracts totaled \$857,000—8.6 percent of the year's core budget.

It should be noted that, in practice, the share of FPTA-related research of INIA's total research is much larger than the allocated budgetary 10 percent would suggest. INIA generally spends nearly 70 percent of its core funding on salaries and overhead costs, 20 percent on its own research operations, and 10 percent on the FPTA. This means that the FPTA accounts for nearly a quarter of the total sum that INIA spends on research.

The total of \$1 million in research contracts in 1991 overwhelmed INIA. The main problems were that INIA lacked experience in managing such a fund and supervising research done by non-INIA researchers outside the institute. In the first year, INIA learned a number of lessons from managing the fund:

1. *Limit the number of projects.* The projects unit had to handle too many projects simultaneously. To reduce the number of projects and to manage them more efficiently, the unit designed and implemented better controls and procedures.
2. *Ensure that projects are properly described and kept on schedule.* Some projects were poorly designed, and some began to fall behind schedule almost immediately after they had begun. INIA prepared guidelines for submitting and evaluating proposals and projects, requiring regular progress reports from partner institutes.
3. *Ensure that projects do not compete with INIA's own initiatives.* Some researchers feared that FPTA projects might encroach on INIA's own research. However, area managers and heads of programs are deeply involved in INIA's planning process and can easily identify possible areas of conflict.

All FPTA projects are based on contracts, and the basic contract has gone through several stages of perfection. As one INIA manager explains, "Every clause in the ba-

sic contract is based on experience. If we were faced with a problem, then we added a clause to the contract to prevent that type of problem from surfacing again."

One example of such a problem is that in the first year, the researchers funded by INIA had great difficulty obtaining the money that INIA had transferred to their institutions. INIA then placed the funds in special, private accounts for each researcher. While this solved the researchers' funding problem, it created problems of accountability and commitment from the researchers' institutions. INIA then went back to funding researchers through their institutions, but with the caveat that both the researcher and the top management of the researcher's institution commit in writing to the project, and that the receiving institution disburses and controls the funds in a timely and appropriate fashion.

The main mechanism for managing the FPTA is INIA's projects unit. The unit coordinates the planning, monitoring, and evaluation of all INIA projects, including those in the FPTA.

INIA issues an annual FPTA report, which shows the totals committed for the year, the total disbursements for the year, a listing of all projects (with amounts authorized and disbursed), the status of each project (e.g., 50 percent complete), and projects by organization and national program, plus a summary of the information of previous years.

Administrating the fund

Project selection process

INIA arrived at the following procedure for selecting and contracting research proposals:

Priority setting within INIA. Through its ongoing process of consultations, particularly with farmers, INIA defines priority areas of work. It then decides which work it can and wants to do in-house and which initiatives could be better carried out by individuals and organizations outside INIA. The key criteria for deciding which projects should be undertaken where are (1) the urgency of the problem, (2) the organization or institution most likely to do the research successfully, (3) the comparative advantage of the staff and organizations involved, and (4) the opportunity to establish alliances between INIA and a third party to achieve a more efficient implementation of projects, through, for example, joint implementation and joint financing.

Call for projects. Through project guidelines, posters, and the mass media (especially radio), INIA publicizes the kinds of research that are eligible for FPTA funding. INIA distributes its guidelines for preparing proposals to any interested party, including national, interna-

tional, public, and private organizations. The kinds of organizations that collaborate with the FPTA is expanding. For example, private consulting firms conduct farm and price surveys, and, as wheat is an important crop in the country, the International Maize and Wheat Improvement Center (CIMMYT) and INIA launched a joint project in which the FPTA contributes \$100,000. INIA has also begun to explore the possibility of inviting other organizations abroad to participate in the fund.

Submission of proposals. Interested parties can submit research proposals with INIA's headquarters or the nearest INIA regional station. They can hold a presentation of the proposal and discuss it with INIA staff at the point of submission. This means that travel for outside researchers is kept at a minimum, and it involves staff at the regional stations in the FPTA.

The FPTA can fund all or part of a project. The greater the level of cofunding available for a project, the greater is the probability that the FPTA will also provide support.

Acceptance by the projects unit. The INIA projects unit ensures that proposals meet all funding requirements. The main requirements are (1) the proposal must be signed and submitted by both the researcher and the management of the researcher's institution, (2) the researcher who is designated to work on the project must have the proper professional background, (3) the project proposal must state a clear objective and include a budget and justification of cost estimates.

Proposal evaluation. The *projects unit* evaluates whether

- the general objective is clear
- there is coherence among general objective, specific objectives, and goals of the project
- activities have been clearly identified
- the budget stays within reasonable limits and the items in the budget are reasonable (no overhead charges are allowed)
- the tasks and contribution of the counterparts are clear

The *heads of programs* and the *research supervisors* assess whether

- the proposal does indeed meet the priorities of the program
- there is coherence among the objectives, activities, and expected results

The *finance and administration unit* determines if the budget is financially sound and if items and costs are reasonable.

The *office of the national director* verifies that the projects unit forwards the proposal with a recommendation to the national director for his review.

The *board of trustees*, which receives the recommendation of the national director, can accept, reject, or partially approve a proposal.

Signing of contracts. Once the board of trustees has approved a project, INIA's president (representing the board) and the management of the researcher's institution sign a formal "contract of technological linkage."

Monitoring and supervision. Every project is monitored and supervised at various levels. As said above, every project is assigned a research counterpart from INIA's research staff, who is responsible for monitoring and technical evaluation of the research. The finance and administration unit monitors and controls budgetary disbursements. The projects unit is responsible for

overall coordination. For example, before the finance and administration unit allows any further disbursement of funds, the projects unit ensures that INIA has received a progress report and that INIA's technical counterpart has accepted it.

Type of funding

The FPTA provides so-called "contingency nonrepayment" funding; funds are provided as grants and do not have to be paid back unless the project generates an income. In the latter case, the FPTA can require repayment of all or part of the funds.

The FPTA can finance up to 100 percent of the following project items:

1. *Investments.* Machinery, research equipment, publications.
2. *Human resources.* Labor costs for additional personnel and consultants. However, the fund does not supplement researchers' salaries.
3. *Travel, missions, and training.* Trips, short courses, and training within the country (in exceptional cases, outside the country).
4. *Inputs and supplies.* Agricultural inputs, laboratory supplies, general supplies.
5. *Repair and maintenance.* Repair and maintenance of equipment used in the project.
6. *Services.* Rents and assorted services.
7. *Extension.* Field demonstrations, technical training, information activities, publications, and others.

Initially, under item 2 (human resources) non-INIA researchers working in an FPTA project were eligible for a salary supplement. This was in recognition that many researchers, particularly in the universities, are generally poorly paid. Two significant problems arose from this policy. First, as some projects were extended, some researchers outside INIA began to see the FPTA as a permanent supplement to their salaries. Second, with the supplement, some non-INIA researchers earned more than INIA researchers did, which created resentment within INIA. INIA's board of trustees therefore decided that the fund should not be seen as a source of additional income for researchers and that only additional payments for extra services would be considered.

Project profile

Since 1991, the FPTA has contracted over 77 projects with over 25 institutions and organizations (see table 1).

Partner	Share of total contracts
University of the Republic of Uruguay	48%
Ministry of Livestock, Agriculture, and Fisheries	16%
other public nongovernmental organizations	12%
private companies	19%
other organizations, e.g., CIMMYT	5%

The average grant per FPTA project during 1991–96 was about \$25,000. The lowest grant was \$5,000, and the highest was \$100,000. To partially recover the costs of managing the FPTA (including staff time spent on evaluating project proposals and supervising project progress), INIA includes an eight-percent overhead charge on all approved projects.

All FPTA projects are for two years and must have objectives achievable within this time. However, if justified, the FPTA can fund follow-up projects. An example of one of these projects is provided in box 2.

With the introduction of the requirement of progress reports and closer controls, most of the projects began to be completed in time. A few projects ran behind schedule, in particular those that started in 1991, FPTA's first year of operation, and some projects have had to be canceled.

Of the total number of FPTA projects completed, the results of 15 percent could be adopted immediately, nine percent were "practical" and could be adopted with very little additional work, 58 percent of the results created better understanding of the problems and provided a basis for further work, and 18 percent were considered purely theoretical. INIA is very satisfied with these results.

The role of the FPTA in the Uruguayan NARS

By maintaining a balance between the projects funded through the FPTA and its own research, INIA can build its own capacity, make strategic use of the capabilities of other organizations, and help form and maintain a coherent NARS. The FPTA has been instrumental in the creation of a national system of relationships and interactions, which has brought about a continual flow of information and a capacity to transform scientific research to practical solutions. The success of the FPTA lies particularly in the technical and practical nature of the research it sponsors. It encourages research to produce practical results in the short term. It can thus respond to a fairly immediate demand for technical solutions.

The FPTA could be regarded as a mechanism for promoting and financing competitive projects. But since Uruguay is a relatively small country with very few re-

search organizations and hence little competition, the FPTA has become particularly valuable as a tool to forge alliances, integrate efforts, and attract international expertise.

Advantages and disadvantages of the FPTA

INIA has found that the fund

- is a very flexible mechanism for linking to national and international sources of knowledge
- turns competitors into allies
- takes advantage of available facilities at other institutions and helps prevent INIA from installing facilities that may become underutilized

Box 2. Example of an FPTA-funded project: Blackbird management in rice production by Dr. Ethel Rodriguez, project leader

Rice has become one of the most important crops in Uruguay, but it is susceptible to birds, a common rice pest all over the world. In Uruguay, the blackbird of the genus *Agelaius* causes much damage. INIA launched an initiative in 1996 to study the biological and economic impact of the bird's damage to rice and to formulate an ecologically sound strategy to control the damage.

The study proposed three projects, the first of which was begun in 1996. This first, two-year project examines the biological characteristics of the *Agelaius*, explains how it becomes a rice pest, evaluates the economic damage it causes, and will propose strategies to control it. INIA initiated a second, two-year project that will apply and evaluate management practices to control the damage within a test area. If the second project is successful, then a third project could extend these practices to Uruguay's whole rice production area.

These projects are the joint effort of the three institutions most concerned with the problem: INIA; the Ministry of Agriculture, Livestock, and Fisheries; and Uruguay's Rice Growers' Association. INIA, through its FPTA, funds the operational costs. Some research staff in the Ministry do the research, and the Rice Growers' Association manages the funds. This three-partite collaboration has contributed to achieving good research results.

- is a useful mechanism for different organizations to agree on areas that require action
- helps create and coordinate a true NARS
- allows INIA to tap into ongoing research at other organizations and institutions
- helps INIA rapidly address specific problems without having to build up its own physical and human capacity
- strengthens INIA's negotiating position with potential donors
- allows the government to increase financial support to agricultural research with strong support from INIA stakeholders

- has become a multiplier for attracting additional financial, human, and physical resources

At the same time, INIA is aware that the Fund

- requires skills in negotiating, management, and controlling costs
- can be a source of tension with other organizations. For example, the issue of salary supplements generated much debate.
- can create pressure to fund projects for other than technical reasons. Political pressure, for example, is sometimes difficult to ignore.
- can create false expectations with other organizations or institutions. Some believe it is their right to be supported by the FPTA.

Managing the FPTA

Key lessons

A survey among INIA staff and researchers financed by the FPTA indicated that the following factors contributed to the success of the FPTA:

Increasing available resources. The FPTA increases the resources available for research. Even though the FPTA has resulted in additional agricultural research in the country, no agricultural research organization in Uruguay has had its budget cut. On the contrary, the FPTA brings in additional resources through the matching funds.

Short project duration. The two-year limit on FPTA-funded projects encourages researchers to focus on results. The fund is established to develop agricultural technology rather than do in-depth research, so researchers aim at producing results in the short term. This has been a challenge, in particular for researchers who are not used to producing results under tight deadlines.

Efficient management. Researchers financed through the FPTA praise the way in which INIA's projects unit manages the fund. The unit focuses on solving problems, which often involve providing resources at short notice for the acquisition of specific inputs. The key to the success of such a unit seems to be recruiting excellent staff but keeping the unit lean, so that its members are encouraged to focus on the most urgent issues. INIA's projects unit has three professional staff, all of whom work on the FPTA on a part-time basis.

Rapid feedback. Researchers financed through the FPTA also praise the response time of the projects unit. Researchers say the unit normally responds to ques-

tions raised at meetings or by telephone within two working days.

Effective controls. INIA strictly adheres to the requirement that FPTA researchers file progress reports in a timely fashion and document expenses properly.

Knowledgeable about research. All INIA staff involved in planning and managing projects financed by the FPTA have a great deal of experience in agricultural research. They are therefore aware of and sympathetic to the concerns and needs of researchers outside INIA and enjoy credibility and legitimacy with them.

Knowledgeable about national capabilities. INIA staff are well informed of the facilities that are available nationally. This has helped them identify and prepare potentially successful projects.

Objective evaluations. INIA hires staff for their technical expertise and experience and not because of their political alliances. Political issues, therefore, rarely arise in planning, monitoring, and evaluating projects. FPTA projects are reviewed on the basis of objective, technical considerations.

Problems in managing the FPTA

INIA has identified the following problems in managing the FPTA:

Collecting funding. The most fundamental problem that INIA faces with regard to the FPTA is collecting the legal allocation of the 0.004 percent cess from the VAT on farm sales. The public treasury is responsible for collecting the cess, but it has been slow in informing INIA of how much has been collected and allocating these

funds to the institute. This makes it very difficult for INIA to plan FPTA projects effectively for the next quarter.

Diffusion of research results. According to some researchers financed through the FPTA, INIA allocates insufficient effort and funds to the diffusion of project research results. The projects focus on research rather than diffusion.

Identification of project ideas. Some researchers financed by the FPTA, in particular in the private sector, wonder whether INIA will be able to solicit enough new and innovative ideas for short-term, technical projects in the coming years.

Assigning INIA technical counterparts

Each project supported by the FPTA requires a technical counterpart from INIA. While most INIA staff are happy to participate in FPTA projects, there have been cases where staff feel overloaded with the additional responsibilities. INIA will have to consider the issue of recognizing staff's time in counterpart duties and taking these duties in consideration in evaluating staff performance.

Patenting and commercialization of research results.

The current basic contracts states that the FPTA can recover all or part of its funding if project results are applied commercially. However, the basic contract fails to cover instances where the returns are greater than the investments. INIA still needs to study the issue of sales and royalties from research results.

Conclusion

From its inception in 1989 onwards, INIA has enjoyed strong political support, also from farmers' associations. In INIA's experience, the 0.004 percent cess on farmers' products has created awareness among farmers of INIA's activities. INIA would also like to involve farmers more in identifying projects. Farmers are increasingly interested in how their money is being spent and in benefitting directly from INIA's work. They discuss their concerns with INIA staff, and many are willing to participate in the working groups that plan and review INIA's research activities.

The FPTA has been instrumental in marshaling support for INIA throughout the country's agricultural sector. It has established INIA as the key coordinator of the Uruguayan national agricultural research system. The FPTA has strengthened collaboration with international organizations such as CIMMYT and a number of foreign universities. INIA is now discussing potential projects with countries such as New Zealand and China.

The concept of the FPTA can be applied differently in different countries. As Uruguay is a relatively small country with few players in the agricultural research sector, FPTA's strength lies particularly in establishing and reinforcing alliances.

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About ISNAR: The International Service for National Agricultural Research (ISNAR) assists developing countries in making lasting improvements in the performance of their agricultural research systems and organizations. ISNAR promotes appropriate agricultural research policies, sustainable research institutions, and improved research management. ISNAR's services to national research are ultimately intended to benefit producers

and consumers in developing countries and to safeguard the natural environment for future generations. A nonprofit autonomous institute, ISNAR was established in 1979 by the Consultative Group on International Agricultural Research (CGIAR). It began operating at its headquarters in The Hague, the Netherlands, on September 1, 1980.

Isnar

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